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# TypeScript Crash Course



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## Prerequisites

You should have complete understanding of JavaScript before understanding TypeScript.

OR

You should have knowledge on any high level programming language like Java.



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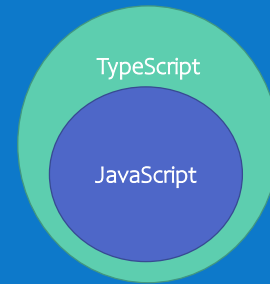
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# What is TypeScript?

- ✓ TypeScript is superset of JavaScript.
- ✓ Developed By Microsoft in 2012.
- ✓ It compiles to plain JavaScript.
- ✓ It can be easily integrated into JavaScript Applications.



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# TypeScript Features

- ✓ Static Type Checking
- ✓ ES6 Features
- ✓ Class Based Objects
- ✓ Modularity
- ✓ Less Bugs, Predictability, Readability, Rich IDE Support.
- ✓ Fast Refactoring.
- ✓ Cross-platform and cross-browser compatibility.
- ✓ Smooth Learning curve.
- ✓ You can adopt TypeScript in your existing JavaScript projects by spending less amount of time.

```
let message = "Hello"  
message = 5
```

Type 'number' is not assignable to type 'string'. ts(2322)

```
let message: string
```

View Problem (Alt+F8) No quick fixes available

```
message = 5
```



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## TypeScript Installation with TSC

- ✓ You should have installed Node.js in your machine before using below commands.
- ✓ Download and Install Node.js: <https://nodejs.org/en/download/>
- ✓ npm install typescript -g
- ✓ Check version: tsc -v
- ✓ How to Compile? tsc filename.ts or tsc

```
C:\Users\VenkateshMogili>tsc -v  
Version 4.3.5
```



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## TypeScript Installation with Babel

- ✓ You can compile TypeScript code with Babel package also.
- ✓ Download and Install Node.js: <https://nodejs.org/en/download/>
- ✓ npm init -y
- ✓ npm i typescript @babel/preset-typescript @babel/plugin-proposal-class-properties @babel/plugin-proposal-object-rest-spread
- ✓ **.babelrc** or **babel.config.js**:  
{ "presets": [ "@babel/typescript" ], "plugins": [ "@babel/proposal-class-properties", "@babel/proposal-object-rest-spread" ] }
- ✓ **package.json**: "scripts": { "start": "tsc" }
- ✓ **tsc -init** (**tsconfig.json**: { "compilerOptions": { "target": "esnext", "strict": true, "noEmitOnError": true } })
- ✓ "include": [ "src" ]
- ✓ How to compile? npm start



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## TypeScript Compiler (TSC)

- ✓ Code will be written in TypeScript file with extension .ts
- ✓ It will convert .ts to .js as browser supports only (HTML, CSS and JavaScript)
- ✓ It should be installed using NPM Package (Node.js)
- ✓ It supports all the versions of JavaScript.

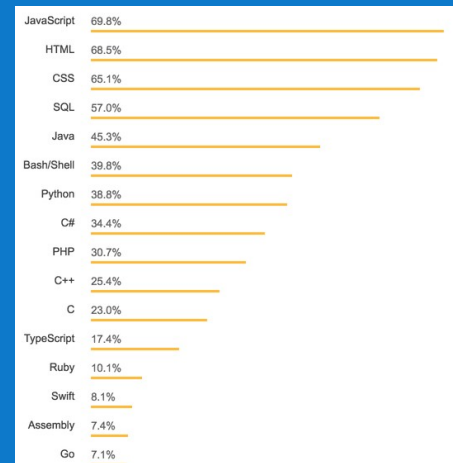


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## JavaScript vs TypeScript

- ✓ TypeScript is simply superset of JavaScript, every concept of JavaScript also supports in TypeScript.
- ✓ But every concept in TypeScript won't support in JavaScript.
- ✓ TypeScript has static type checking feature, whereas JavaScript doesn't have such feature.
- ✓ TypeScript is not a new language, it's just an extension of JavaScript for faster JavaScript Application development with less bugs in production.



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## TypeScript Types and Static Type Checking

- ✓ Static Type Checking means detecting the errors before compiling the code and it's completely optional.
- ❖ TypeScript Supports the below types:
  - ✓ String, Number, Boolean, Any
  - ✓ Objects, Arrays, Void, Null, Undefined, Tuples, Enums, Generics, Interfaces, Custom Types
  - ✓ It supports class based objects OOPS functionality, access modifiers, inheritance, encapsulation etc.,



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## TypeScript Basics Practical

- 1) Project Setup
  - 2) Simple Hello World Program
  - 3) Compiling, TSC Config, Compiler in watch mode, Strict and Error free Compilation, Default Compiler/Custom Compiler (ES6,ESNext etc.,)
  - 4) JavaScript code vs TypeScript code (Annotations - :Type)
  - 5) Type Inference vs Type Assignment
- ❖ *Note: TypeScript detects the errors in compile time, not the runtime as Browsers won't support TypeScript to run.*
  - ❖ Anything that is written in TypeScript can be written in JavaScript with more work around and with complex logics.



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## TypeScript Types Practical

### ❖ Basic TypeScript Types:

- ✓ String
- ✓ Number
- ✓ Boolean
- ✓ Any – not recommended
- ✓ Arrays
- ✓ Tuples – fixed length and fixed type arrays
- ✓ Union
- ✓ Enum
- ✓ Objects, Type Assertion, null, undefined



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## TypeScript Types Practical

### ❖ Advanced TypeScript Types:

- ✓ Functions
- ✓ Parameters
- ✓ Optional Parameters
- ✓ Return Type
- ✓ Return Void, Never
- ✓ Interfaces vs Custom Types
- ✓ Unknown vs Any



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## TypeScript Types Practical

### ❖ Advanced TypeScript Types:

- ✓ Classes
- ✓ Access Modifiers
- ✓ Encapsulation
- ✓ Interfaces to Class
- ✓ Inheritance
- ✓ Generics



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## React with TypeScript

- Add TypeScript to New React Application
- `npx create-react-app my-app --template typescript`
- OR
- Add TypeScript to Existing React Application
- `npm install --save typescript @types/node @types/react @types/react-dom @types/jest`



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## Summary

- ✓ TypeScript is nothing but superset of JavaScript.
- ✓ It makes code more readable, descriptive and prevent errors in compile time.
- ✓ It can be compiled using either tsc or babel compilers.
- ✓ It is the current and future trending technology for software developers.
- ✓ It supports all the JavaScript data types along with other new types such as Interfaces, Enums and Generics.
- ✓ It can be integrated with React, Angular, Vue, Express or any JavaScript Frameworks.



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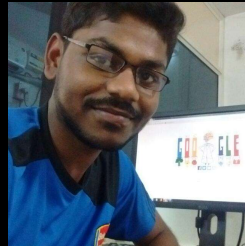


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